PROG DEV
472

MANCHESTER HARBOR
MASSACHUSETTS

SURVEY
(REVIEW OF REPORTS)

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

JUNE 1969

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20315

IN REPLY REFER TO

ENGCW-PD

SUBJECT: Manchester Harbor, Massachusetts

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress the report of the Board of Engineers for Rivers and Harbors, accompanied by the report of the Division Engineer, in response to a resolution of the Committee on Public Works of the House of Representatives, United States, adopted 5 May 1966, requesting a review of the report on Manchester Harbor, Massachusetts, published as House Document No. 447, Seventy-seventh Congress, First Session, and other reports, with a view to determining the advisability of modifying the existing project in the interest of navigation.

2. The Division Engineer finds that essentially all of the authorized Federal navigation project has been dredged by the Commonwealth of Massachusetts, and that further improvement of the entrance channel and anchorage areas is not economically justified at this time. He concludes that the most practicable solution to provide for present and prospective navigation needs is the construction of suitable marina facilities by local interests. He therefore recommends that no modification of the authorized Federal project be made at this time.

3. The Board of Engineers for Rivers and Harbors, noting the findings of the Division Engineer, reports that modification of the authorized project for Manchester Harbor, Massachusetts, in the interest of navigation, is not advisable at this time.

4. I concur in the views of the Board.

F. J. CLARKE
Lieutenant General, USA
Chief of Engineers

ENGBR (5 June 69) 1st Ind
SUBJECT: Survey (Review of Reports) Manchester Harbor, Massachusetts

Board of Engineers for Rivers and Harbors, Washington, D. C. 20315
24 July 1969

TO: Chief of Engineers, Department of the Army

1. The Division Engineer issued a public notice stating his recommendations and affording interested parties an opportunity to present additional information to the Board. No communications have been received.

2. The Board notes the finding of the Division Engineer that further improvement of the entrance channel and anchorage areas is not economically justified, and that the most practicable solution to provide for present and prospective navigation needs would be the construction of suitable marina facilities by local interests. Accordingly, the Board reports that modification of the authorized Federal project for Manchester Harbor, Massachusetts, in the interest of navigation, is not advisable at this time.

FOR THE BOARD:

R. G. MacDONNELL
Major General, USA
Chairman

SYLLABUS

The Division Engineer has studied the requests of local interests for navigational improvements in Manchester Harbor, Massachusetts to provide for the prospective recreational boating fleet. He finds that most of the authorized Federal navigation project, which was adopted in 1945, has been accomplished by the Commonwealth of Massachusetts.

He further finds that modification of the authorized project to enlarge and deepen the existing anchorages in the inner harbor, provide additional anchorage area in the inner and outer harbors, and widen the entrance channel is not justified at this time. The high costs for necessary breakwater protection and ledge removal, the large degree of privately developed shorefront which precludes public access, and insufficient benefits are the primary reasons for lack of justification.

He concludes that, because of the limiting size and configuration of the harbor and the foregoing findings, the most practicable solution to provide for prospective navigational boating needs is by construction of marina facilities by local interests.

Therefore, the Division Engineer recommends no modification of the authorized Federal navigation project for Manchester Harbor, Massachusetts, at this time.

TABLE OF CONTENTS

PLATES

APPENDIXES

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

IN REPLY REFER TO

NEDED-R

5 June 1969

SUBJECT: Survey (Review of Reports) Manchester Harbor, Massachusetts

Resident Member
Board of Engineers for Rivers and Harbors
Temporary Building "C"
2d and Q Streets, S. W.
Washington, D. C. 20315

1. The navigation survey study of subject harbor has been completed in response to the resolution adopted 5 May 1966 by the Committee on Public Works of the House of Representatives, United States. The report is unfavorable to modification of the authorized navigation project at Manchester Harbor, Massachusetts at this time.

2. The Town of Manchester was advised of the study findings. The report includes comments of town officials.

3. In accordance with EM 1120-2-101, paragraph 1-126, and ER 1120-2-25, there are inclosed:

a. Copies 1 to 16 of the subject report (Copy No. 1 signed);

b. Sixteen copies of this letter of transmittal;

c. Three copies of the reduced-size display map, two full-size prints of the report drawings, and sixteen reduced-size prints of the report drawings;

d. Five copies of the public notice of the report and three copies of the list of names to whom the notice will be sent;

e. Two copies of a draft of the report of the Chief of Engineers;

NEDED-R 5 June 1969
SUBJECT: Survey (Review of Reports) Manchester Harbor, Massachusetts

f. A copy of the transcript of the public hearing, including a copy of the public notice of the hearing and a mailing list.

4. Advance copies of the public notice of the report are scheduled to be sent to Massachusetts Congressmen and the Governor of Massachusetts on 18 June 1969. Public release of the notice is planned for 20 June 1969.

6 Incl
as

F. R. DAY
Colonel, Corps of Engineers
Acting Division Engineer

CF:
Div Engr
Mr. Leslie
Mr. Hill
Mr. Arpin
Program Dev Br ✓
Mss. Fyfe, 113-N
Engr Div Files

MFR: Self-explanatory

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

IN REPLY REFER TO:
NEDED-R

5 June 1969

SUBJECT: Survey (Review of Reports) of Manchester Harbor, Massachusetts

Chief of Engineers
ATTN: ENGCW-PD

AUTHORITY

1. This report is submitted in compliance with a resolution adopted 5 May 1966 by the Committee on Public Works of the House of Representatives, United States, which reads as follows:

> "Resolved by the Committee on Public Works of the House of Representatives, United States, that the Board of Engineers for Rivers and Harbors is hereby requested to review the reports of the Chief of Engineers on Manchester Harbor, Massachusetts, published as House Document Numbered 447, Seventy-Seventh Congress, First Session, and other reports, with a view to determining the advisability of modifying the existing project in the interest of navigation."

2. A study of survey scope was assigned by the Chief of Engineers to the New England Division on 15 June 1966.

PURPOSE AND EXTENT OF STUDY

3. This study considered what modification of the authorized Federal navigation project for Manchester Harbor would be required to meet the needs and desires of local interests for providing additional mooring space within the harbor and the area adjacent to the entrance. A public hearing was held in Manchester, 8 June 1967, to obtain the specific navigation improvements desired by local interests. Additional information was obtained from State and local officials subsequent to the public hearing. Available maps,

charts and aerial photographs were studied and field trips were made to observe present conditions. Detailed hydrographic and topographic surveys were made in some areas where improvements are desired to supplement available data.

DESCRIPTION

4. Manchester Harbor is located on the north shore of Massachusetts Bay, approximately 20 miles by water northeast of Boston Harbor and 7 miles southwest of Gloucester Harbor. The well-known Marblehead Harbor is about 5 miles to the southwest.

5. Manchester Harbor consists of a small, elongated cove of Massachusetts Bay, having its long axis in a northeast-southwest direction. The entrance to the area generally termed the "outer harbor" is northward of Baker's Island Light, between House Island on the east and Great Misery Island on the west. The outer harbor lies entirely seaward of Proctor Point and apparently is considered to extend into the bay to the vicinity of Great Misery Island. The inner portion of this area is sheltered to a limited degree from storm waves from the north and east by the curving portion of the mainland ending at Gales Point, and by the group of small islands offshore from the point. Depths available in this area, however, are generally less than 6 feet, precluding its use by larger vessels. Farther out in the bay, depths of 30 feet or more are available, but vessels anchoring there are fully exposed to easterly or southerly storms.

6. The harbor proper, generally referred to as the inner harbor, lies entirely northeast of Proctor Point and offers shelter in storms from all directions except the southwest. Storms from the southwest generate waves over the limited fetch of about 5 miles from the Marblehead shore. The existing dredged channel through the inner harbor, extending from Proctor Point to the railroad bridge, provides depths ranging from 8 to 11 feet. Flanking the channel are several areas of various sizes and depths used for anchorage purposes.

7. The total area of the inner harbor, which can be utilized for anchorage, is approximately 80 acres. The outer harbor from Proctor Point southwest to opposite Ram Island comprises an area of about 60 acres with depths varying from 3 to 9 feet at mean low water.

8. The prevailing winds are from the southwest during the summer and the north during the winter. At all seasons, the strongest gales are usually from the northeast or east. Tidal currents are weak. The mean and spring ranges of tide at Manchester are 8.8 and 9.2 feet, respectively. The locality is shown on United States Coast and Geodetic Survey charts Nos. 240 and 1207 and on the maps accompanying this report.

TRIBUTARY AREA

9. The Town of Manchester, located in Essex County and centered at the head of Manchester Harbor, is about 28 miles by highway from Boston. In 1960 the population was reported at 3,932, an increase of 37 percent over the 1950 population. In this same period, the population of the Commonwealth of Massachusetts increased by 9.8 percent and that of Essex County by 8.9 percent. The town is primarily a residential area and for many years has been renowned as a summer resort. Its commercial activity consists largely of wholesale and retail trade and the operation of facilities to serve the recreational requirements of summer residents and visitors. A few lobstermen fish out of this harbor, limiting their operations to the immediate coastal area. Manchester is one of a number of harbor communities along the north shore region of Massachusetts which comprises an attractive and heavily patronized summer recreational area. It is served by a branch line of the Boston & Maine Railroad and by a network of improved roads which provide communication with all parts of the State.

BRIDGES AFFECTING NAVIGATION

10. A railroad bridge owned by the Boston & Maine Railroad crosses Manchester Harbor near its upstream end. This structure, which was authorized by State law, 26 March 1845, is a bascule bridge providing a horizontal clearance of 48 feet, and a vertical clearance, in the closed position, at mean high water of 6 feet. No other bridge crosses the harbor.

PRIOR REPORTS

11. Manchester Harbor has been the subject of a number of reports dating back to 1886. The latest report in 1941 serves as the basis for the existing project. The reports are tabulated below:

Document and Authority	Type of Report	Improvement Considered and Recommendation
Ex. Doc. No. 85 50th Congress 1st Session R&H Act 5 Aug 1886	Preliminary Exam and survey	Dredging channel 60 ft. wide, 4 ft. deep from Proctor Pt. to town wharves. Favorable.
Ex. Doc. No. 49 53d Congress 3d Session R&H Act 17 Aug 1894	Preliminary Exam	Entrance channel 100 ft. wide, 5 ft. deep, to Proctor Pt. Favorable.
H. Doc. No. 29 55th Congress 1st Session R&H Act 3 June 1896 Sec. 1	Survey Report	Channel 8 ft. deep, 150 - 200 ft. wide from entrance to town wharves and anchorage and turning basin same depth. Unfavorable.
Annual Report Chief of Engrs. 1897 (p. 869) R&H Act, 3 June 1896. Sec. 9	Survey Report	Channel 6 ft. deep and 75 - 100 ft. wide from entrance to town wharves and 2 anchorages 200 x 300 ft. and 125 x 250 ft. Favorable.
H. Doc. No. 58 58th Congress 2d Session R&H Comm. Resol., 25 Apr. 1903	Special Report	Considered desirability of continuing or modifying existing project. Recommended omission of 200 x 300-ft. anchorage basin.
H. Doc. No. 641 64th Congress 1st Session R&H Act, 4 Mar. 1915	Preliminary examination	Removal of Bow Bell Ledge. Unfavorable.

Document and Authority	Type of Report	Improvement Considered and Recommendation
H. Doc. No. 447 77th Congress 1st Session Resol. of Comm. on R. & Hbrs. adopted 22 Dec. 1938	Survey Report	Dredging entrance channel 200 ft. wide, 10 ft. deep in the outer harbor and in the lower half of the inner harbor and three anchorage areas with depths of 10, 8 and 6 feet. Favorable.

12. The original project for Federal improvement at Manchester Harbor, adopted by the River and Harbor Act of 11 August 1888, provided for a dredged channel 60 feet wide and 4 feet deep at mean low water, extending from Proctor Point to the town wharves. This project was completed in 1894. A project, adopted by the River and Harbor Act of 3 March 1899, provided for a dredged channel 75 to 100 feet wide and 6 feet deep, extending from the harbor entrance in the bay to the town wharves; and two turning basins, one 200 by 300 feet just below the Boston and Maine Railroad bridge, the other 125 by 250 feet at the town wharves. Under this project, a channel was provided from the entrance to a point in the inner harbor about midway between Proctor Point and the railroad bridge. Work ceased in August 1903, at which time the project was 31 percent complete. Federal expenditure under these projects totaled $23,985.57, all for new work.

EXISTING CORPS OF ENGINEERS PROJECT

13. The authorized project, adopted in 1945, provides for an entrance channel 200 feet wide and 10 feet deep at mean low water, extending from the 10-foot depth contour in Massachusetts Bay to Proctor Point; and dredged anchorage areas in the harbor between Proctor Point and the Boston & Maine Railroad bridge, affording depths of 10, 8, and 6 feet at mean low water. No work has been done on the authorized project by the Federal Government because local interests did not comply with the requirements of local cooperation. The project has been placed in an inactive status.

LOCAL COOPERATION ON EXISTING AND PRIOR PROJECTS

14. There were no prescribed conditions of local cooperation in connection with the prior Federal projects. The existing project

requires local interests to assume responsibility for the following conditions of local cooperation: (a) Submit for the approval of the Chief of Engineers a plan for the ultimate development of a system of small boat stalls providing space for not less than 100 boats to be available for use within 5 years after completion of the Federal improvement, these facilities to be constructed, operated and maintained by local interests, and open to the public on equal terms; (b) construct such facilities to provide space for not less than 50 boats within one year after completion of the Federal improvement; (c) hold and save the United States free from all claims for damages attributable to the work of improvement.

15. Subsequent to authorization of the Federal project, local interests decided not to develop marina-type facilities. With the exception of two town-owned parks, the land adjacent to the harbor is occupied by large private estates and sufficient land could not be obtained to construct necessary on-shore facilities.

OTHER IMPROVEMENTS

16. Since 1907, the Commonwealth of Massachusetts, aided by contributions from the Town of Manchester, has periodically dredged the harbor to improve and maintain the entrance channel and adjoining anchorages. The improvements have resulted in a channel 10 feet deep, 100 feet wide, extending from the bay to Norton's Point; channel and anchorage areas from Norton's Point to the Boston and Maine Railroad bridge with depths from 6 to 10 feet; and anchorage areas on either side of the channel upstream of Proctor Point to Norton's Point with depths of 6 and 8 feet. In 1940 the State also dredged a 2-acre anchorage basin in the inner harbor above the railroad bridge to an average depth of 8 feet. Including work done in 1967, which included dredging of a trapezoidal basin adjacent to the entrance channel just downstream of the Manchester Yacht Club, about 80 feet wide and 200 feet long, the Commonwealth has expended $831,821 for new work and maintenance, of which the Town of Manchester has contributed approximately $219,000.

TERMINAL AND TRANSFER FACILITIES

17. Terminal facilities in the inner harbor above the bridge include a 38-boat private marina with launching ramp, a Town Wharf with a public ramp adjacent to it, and a float landing for members of a local

fraternal organization. Facilities along the west bank of the main harbor include two boatyards equipped with marine railways, and the Manchester Yacht Club at Tucks Point. Along the northeast shore of the harbor, the Town owns and operates three public landings with floats to provide for transfer of passengers to boats anchored in the harbor. In addition, 11 private piers with floats are scattered throughout the harbor area. An old coal wharf which is in disrepair also exists at the upper end of the inner harbor above the railroad bridge. There is no longer any freight traffic in the harbor.

18. Transient vessels visiting Manchester are assigned by the harbormaster to a private or town-owned mooring temporarily vacant. This mooring is available without charge. The transient may apply for overnight dock space, or for a yard mooring at one of the boatyards. If he uses yard facilities, a charge is made. For discharging passengers, or loading supplies, the transient has available four sets of Town floats, three sets of yard floats and two sets of club floats, without charge. The tie-up time is limited to 1 hour. Fuel is available at the yards, ice at one yard and water at one town float, each yard and the yacht club. The Manchester Yacht Club furnishes launch service to transients who are members of other recognized yacht clubs. Two of the town floats are located within a short walking distance to the shopping area where food, hardware, medical and other supplies are available.

19. The two boatyards handle repairs to hull, rigging, or power plant. Of the four railways, the largest can haul boats up to 70 feet in length and 9 feet of draft.

EXISTING AND PROSPECTIVE COMMERCE

20. Commercial traffic in Manchester Harbor now consists entirely of a relatively small amount of fresh fish and shellfish landings. Local coal dealers have been phased out of business since the Federal project was adopted in 1945. Fuel oil and other petroleum products are now delivered overland. A fishing fleet of 20 vessels consisting mostly of lobstermen operates out of the harbor. In 1966, 115 tons of fresh fish and 231 tons of shellfish were landed in the harbor. The fishing vessels represent about 5 percent of the total craft using the harbor. The fishermen find the harbor adequate for their use. They are hindered only by the crowding of mooring areas and the channel by recreational craft.

VESSEL TRAFFIC

21. Ninety-five percent of the vessel traffic in the harbor consists of locally-based and visiting recreational craft. Today, Manchester Harbor is filled despite additions of usable space in the last 20 years. The following figures illustrate the growth.

Type of Craft	Year	
	1938	1966
Power Cruisers	45	97
Auxiliary Sailboats	35	132
Sailboats, 20 - 50 feet	30	38
Sailboats under 20 feet	35	84
Fishermen, primarily lobstermen	10	20
Outboards at moorings	--	66
Outboards at marinas	--	38
Total	155	475

Thus, the increase in the locally-based recreational fleet from 1938 to 1966 was over 200 percent.

22. No record is available of the number of vessel trips in the waterway. It is known that the locally-based fleet makes numerous daily trips during the boating season. Also, considering the large number of transient craft operating in the area, it is estimated that at least 1,000 boats visit the harbor during the boating season, stopping over for one or two days, depending upon the availability of anchorage space. Most of the transient craft are assigned anchorage space outside, off the Manchester west shore near Glass Head, because of the limited number of moorings within the harbor.

IMPROVEMENTS DESIRED

23. A public hearing was held in Manchester, Massachusetts on 8 June 1967 to determine the nature and extent of navigation improvements desired by local interests. The Chairman of the Manchester Harbor Improvement Committee presented a plan calling for abandonment of the existing Federal project as authorized in 1945 and to make a study of the present day needs of the harbor. Specifically, the improvements requested were:

(a) Dredging the inner harbor above the railroad bridge to the maximum extent possible to a depth of 6 feet;

(b) Dredging a new mooring basin of unspecified area and depth in the outer harbor off Glass Head west of the entrance channel;

(c) Dredging the bank of mud and sand to 9 feet and about 200 feet wide and 1,500 feet long extending along the northwest edge of the channel from the Manchester Yacht Club to Glass Head;

(d) Dredging a new mooring basin in the area bounded by Proctors Point, Long Beach, and the Ram Islands, amounting to about 40 acres, to a depth of 12 feet with protection by a breakwater along the chain of the Ram Islands;

(e) Widening the main channel from Proctors Point to deep water (200-foot wide channel authorized in 1945);

(f) Removing Bow Bell Ledge in the inner harbor, and some boulders in the outer harbor southerly of Proctors Point;

(g) Deepening Whittier's Cove to 10 feet and dredging the sand banks along the shores about halfway back to the high waterline;

(h) Dredging Proctors Cove (just northward of Proctors Point) to an 8-foot depth including dredging the banks halfway to high waterline.

24. Local interests pointed out that the State of Massachusetts, in cooperation with the Town of Manchester, had dredged nearly all of the authorized Federal project with the following exceptions: The recommended 200-foot wide, 12-foot deep entrance channel had been dredged to a 100-foot width and a 10-foot depth, and the authorized 10-foot deep Federal anchorage at Whittier's Cove had been dredged to 6 feet. The Committee desired additional improvements in view of changed conditions since the Federal project was authorized. These included expansion of the overcrowded, dredged areas. Because of a lack of anchorage area in the inner harbor, vessels must use the outer harbor, which is exposed and distant from shore facilities.

DIFFICULTIES ATTENDING NAVIGATION

25. The principal difficulty concerning navigation in Manchester Harbor is a lack of anchorage space within the harbor to accommodate the locally-based and transient recreational fleets. The Town has been aware of this problem for many years and, with the aid of the State, has attempted to provide as much open anchorage area as possible. However, since 1960 the harbormaster has been forced to assign more and more boats to moorings in the outer harbor off the Manchester west shore. In 1966 there were 20 boats moored here. This area is distant from onshore landing facilities and is unsafe in bad weather.

26. Moorings in the harbor are free swinging with boats lying to a single anchor. Most dredged portions of the harbor are considered to be adequate in depth but insufficient in area. As a result, over the years the harbormaster has devised a plan of alternating moorings for various sizes of craft. Small sailboats and outboards are moored closely around and over Bow Bell Ledge, utilizing the entire rock area. By using this method, about 10 percent more craft have been fitted into the anchorages and channel than is normal for this tidal range. Bow and stern mooring systems have been studied, but due to the configuration of the harbor the area will accommodate fewer vessels using this system because of the need for access channels. The largest craft, over 60 feet, are occasionally moored in this manner because there is no room for them otherwise. There has been trouble with these vessels moored in this manner due to sudden, strong wind shifts from the southerly direction. The practice is generally considered unsafe.

27. Outside Proctors Point, shallow banks on both sides of the entrance channel lie bare in spots on low spring tides. These banks result in the grounding of small boats which visit from other ports without charts or adequate knowledge of navigation.

WATER POWER AND OTHER SPECIAL SUBJECTS

28. The entire waterway is tidal. There are no problems of flood control, water power, or pollution pertinent to the report. The U. S. Fish and Wildlife Service does not anticipate any adverse effect on fish and wildlife resources should the requested improvements be made.

PROJECT FORMULATION

29. Detailed consideration has been given to the improvements requested by local interests at the public hearing. These improvements are discussed in the following paragraphs and in the order of their listing in paragraph 23.

30. As previously mentioned, the Commonwealth of Massachusetts dredged approximately 2 acres of the inner harbor above the railroad bridge to a depth of 8 feet in 1940. A commercially operated marina located inside the entrance to the inner harbor mooring basin offers dockside accommodations to 38 small outboards. The remainder of the dredged area is filled with some small craft on open moorings and others berthed at the town float. The undredged portion of the inner harbor consists of a relatively small area of marsh, mudflats and pockets of ledge outcrop, dry at low water. Much of the shoreline is riprapped or bulkheaded. The maximum additional anchorage space that could be dredged in this area without building additional bulkheads would be 0.5 acre. Because the inner harbor is fed by a heavy flow of fresh water from the town drainage system, the mooring basin has shoaled to a depth of about 6 feet since 1940. It is estimated that approximately 10,000 cubic yards of material would have to be removed to make the 0.5 acre available. The cost of this dredging and its subsequent maintenance is not considered to be economically justified by the benefits that would accrue to the few additional boats that could be accommodated. No monetary value was derived for charges and benefits as the latter were not really susceptible to analysis due to small incremental improvement involved.

31. In response to paragraph 23(b), consideration was given to development of a mooring basin on the west side of the harbor entrance, seaward of Glass Head. At present, approximately 20 boats are moored in this exposed area during the boating season awaiting assignments to interior moorings. These boats are exposed to summer storms from southerly quadrants. From field investigations and office studies, it is determined to be uneconomic to provide adequate and safe mooring at this site. Existing depths in the area range from 10 feet at a distance of 1,500 feet offshore to 3 feet at 200 feet from the high water shoreline. The maximum area available at this site for development of an anchorage amounts to 22 acres. Dredging would be required to a depth of 10 feet to allow sufficient bottom clearance for the larger craft during periods of ground swells caused by storms at sea.

Orientation of an offshore breakwater to protect this anchorage would necessitate cutting off the present direct channel approach, resulting in the need for dredging a new entrance channel close to the Ram Island ledges, thus creating a navigational hazard in the harbor approach. A breakwater structure to protect this site would have to be a minimum of 1,200 feet in length. Maintenance of an anchorage at this location would be costly because the anchorage would act as an unnatural basin in the smooth bottom configuration, intercepting the normal drift of loose material along this stretch of shore. Because preliminary estimates for construction and maintenance of the considered improvement were found to far exceed the benefits that would be derived for providing the usable space, attention was given to the anchorage on the east side of the outer harbor as requested by local interests in lieu of the westerly anchorage. The east side, outer harbor anchorage is discussed in paragraphs 33 and 34.

32. The request for removal of a mud bank on the western side of the existing channel between Glass Head and Manchester Yacht Club (para. 23(c)) to provide additional mooring space was investigated. The maximum area that could be gained would consist of a strip 100 feet wide by 1,200 feet long. Because of its exposed location, the area would be suitable for only the larger recreational boats averaging 30 feet in length. Mooring of these boats in overlapping circles would require a radius of approximately 100 feet, which would allow the craft to swing into the channel. Boats of this size could not be moored safely fore and aft to keep them out of the entrance channel due to the exposure. Thus, the available area for anchorage is only half the width required. In view of the foregoing, no benefit-cost analysis was made.

33. In lieu of developing an anchorage area outside Glass Head, local interests suggested (para. 23(d)) that the shallow cove between Proctors Point and Ram Island ledges be dredged to provide added anchorage space. Natural depths in this cove range from 4 to 6 feet below mean low water. In order to develop this area, it would be necessary to dredge to a depth of 8 feet to accommodate all types of craft currently using the harbor. The maximum area available for improvement amounts to 30 acres. Because this cove is also located outside the main harbor, breakwater protection would be necessary. The most feasible design and location for the breakwater would be to construct a rubble mound structure from Gales Point along the ledges

toward Ram Island for a distance of 1, 000 feet, then northwesterly toward the entrance channel for 800 feet. The 800-foot portion would be necessary to reduce waves to a height of 2 feet or less in the anchorage. An estimate of first cost of construction was made for this plan based on hydrographic and topographic surveys taken during the course of this study.

34. The design criteria of the considered breakwater was based on a significant wave height of 5 feet passing around the outer end of Ram Island. The estimated cost of the breakwater was based on a side slope of 2 on 1 for the seaward side and 1 on 1 for the harbor side with a top at an elevation of 12 feet above mean low water, 10 feet wide. The estimated total cost of construction for the 30-acre anchorage and the breakwater is $1, 800, 000 (1968 price levels). In order to determine the economic justification of this project, it was considered that the maximum benefits that could be obtained would result from filling the 30-acre anchorage with new boats during the next 20 years while leaving the existing locally-based fleet at its present location. The maximum net benefits are estimated at $35, 000 and would accrue to about 175 recreational craft. The resulting benefit-cost ratio is approximately 0. 4. Because of the isolated location, a public landing would be necessary between Gales Point and Proctor Point. All of the backshore in this reach is occupied by large, privately-owned estates extending inland for a half mile or more, which effectively exclude public access to the shore. Access for construction of a breakwater at Gales Point would also be difficult to obtain.

35. The portions of the authorized Federal project remaining uncompleted are: (a) Widening the entrance channel to 200 feet and deepening to 10 feet (para. 23(e)); (b) removal of Bow Bell Ledge and scattered boulders in the vicinity of Proctor Point to 10 feet (para. 23(f)); (c) deepening the Federal anchorage at Whittier Cove to 10 feet (para. 23(g)). Local interests desire completion of the project and deepening of the portion of the Federal project at Proctor Cove from 6 to 8 feet. In 1938, there was a relatively large number of auxiliary schooners, sloops, and fishing boats drawing up to 10 feet using the harbor. Since that time, the size and draft of recreational boats has decreased so that a depth requirement in excess of 8 feet in the entrance channel is not considered to be necessary. While the number of boats has increased since 1938, it is now uncommon to see craft of any type with lengths in excess of 50 feet and auxiliary sailboats and sailboats with drafts in excess of 6 feet. For the

number and average size of craft involved, a 100-foot wide channel is considered adequate. This is based upon experience at recreational boat harbors in New England having similar channels. Widening the channel to 200 feet from Norton's Point seaward would involve removal of numerous boulders off Proctor Point, in addition to a large amount of dredging. Justification for this work is lacking.

36. At Bow Bell Ledge, probings indicate that there is a small area of ledge with a minimum depth of 6.5 feet. This depth of water is adequate for the majority of recreational craft. The area over the ledge, in fact, is being used now by the smaller recreational craft as anchorage space. The site would continue to be used for this purpose if the ledge was removed. The State removed a large portion of this ledge and many boulders in the vicinity of Proctor Point about 30 years ago, but discontinued any further improvement because blasting endangered the town sewer outfall which extends along the full length of the east side of the harbor to a point offshore in Massachusetts Bay. Although local interests have expressed willingness to assume responsibility for repairs to the pipe if damaged, the removal of the remaining 2,300 cubic yards of Bow Bell Ledge does not appear desirable since there are no reports of vessels striking the ledge.

37. Whittier Cove and Proctor Cove were dredged by the State to a depth of 6 feet in 1957. To increase the depths in these anchorages to 10 and 8 feet, respectively, would involve the removal of approximately 70,000 cubic yards of ordinary material. Whittier Cove is presently used by approximately 40 craft ranging in size from 15 to 40 feet, drawing from 1.5 to 5.5 feet of water. To utilize the desired depth of 10 feet, it would be necessary to remove the 40 boats and reassign the anchorage to 15 of the deepest draft boats in the harbor. This would be the largest number of craft that could be accommodated in free-swinging, overlapping circles. There is no room to expand this anchorage as requested along the shore adjacent to Norton's Point, as it would involve costly removal of ledge outcrops and two private piers. The maximum width of this strip would be only 50 feet, which could accommodate 5 or 6 small craft that do not require the desired 10-foot depth. Twenty-five spaces presently occupied by craft with drafts that require less than the 10-foot depth would be lost by deepening the anchorage. Deepening the existing anchorage from 6 feet to 8 feet in Proctor Cove would result in a similar reassignment of craft. At present, 65 or more craft occupy this anchorage.

They are presently arranged in size like those in Whittier Cove to take advantage of the difference in required mooring scope. To utilize fully the added depth of 2 feet, all but 32 of the larger craft would have to be relocated. Because of the overcrowded conditions already experienced, reassignment of the remaining small craft to new locations of open anchorage would be difficult to accomplish. No benefit-cost analysis was made because of the apparent lack of discernible benefits.

38. In addition to the areas of dredging requested at the public hearing, there are two other areas which remain unimproved for navigation: Days Creek and a cove immediately south of Days Creek. Both of these areas are surrounded or adjacent to large, private estates which hold claim on the offshore mudflats. These areas have not been improved in the past due to strong opposition of local residents and are, therefore, not considered to be susceptible to improvement as open anchorage.

PLAN OF IMPROVEMENT

39. Analysis of the justification for expanding open anchorage at Manchester Harbor indicates that there is no feasible way of expanding open anchorage area. The analysis further indicates that construction of suitable marina facilities by local interests is the most feasible way to provide additional mooring space.

DISCUSSION

40. Manchester Harbor is situated on the north shore of Massachusetts Bay in an area widely recognized as an important yachting center of New England. It lies about 20 miles northeast of Boston and midway between the harbors of Beverly and Gloucester. Because of the excellent natural shelter that the main harbor offers, it is the home base of approximately 500 recreational craft of all types and sizes. Every portion of the harbor, including the entrance channel, is devoted to mooring space. In some cases the boats are so close together that they swing and foul each other when wind or tides change.

41. Since 1960, the harbormaster has assigned more and more craft to space in the outer harbor off the West Manchester shore. In 1966, there were 20 craft located here. The location is inconvenient from the point of view of distance to any public landing and it is unsafe in bad weather because of lack of shelter.

42. The authorized Federal navigation project was not constructed by the Federal Government due to lack of local agreement. The Commonwealth of Massachusetts, aided in part by local cash contributions, dredged over the past 30 years between 80 and 90 percent of the proposed Federal project. Until recently, the Town had considered the State work generally adequate for the type of craft using the harbor. Local fishermen find the harbor deep enough for their use but are bothered by the crowding of the mooring areas.

43. At the public hearing held in Manchester in 1967, local officials requested that the authorized Federal project be abandoned and that the present day needs of the harbor be studied in the light of the new conditions, with consideration given to enlarging and deepening areas in the harbor already improved by the State, and development of three new areas outside of the limits of the Federal project to relieve the congestion. Investigation of these sites indicates that they cannot be developed economically. The inner harbor above the railroad bridge was dredged by the State in 1940 to the maximum extent possible. Enlargement and deepening of Whittier and Proctor Coves could result in a reduction of the number but an increase in the value of craft that these anchorages could accommodate. Provision of any improved anchorage area outside of Proctor Point would include the need for breakwater protection from easterly storms. Detailed study for development of anchorages in the Gales Point and Glass ~~Point~~ Head areas indicated this construction would not be justified economically. In addition, it is unlikely that access for construction of breakwaters or public landings could be readily obtained by the Town because of the residential character of the backshore areas. The entire shoreline along the east and west sides of the entrance harbor, both inside and out, is privately owned. Residents in this area are opposed to any development that would open the area to the public.

44. Since the harbor is presently utilized by the locally-based recreational fleet and no room exists for adequate open anchorage, the only alternative to future development is the construction of public or privately-owned marinas. Town officials have indicated that the two public parks abutting the shoreline are inadequate in area to provide the onshore facilities needed for marina construction. Particular emphasis was placed on a lack of adequate parking space that could be set aside for boat users. Land owners in the immediate area of the harbor have voiced strong objection to marina development, especially along the east side and in the area of the Manchester Yacht

Club because of noise and overcrowding by non-residents. Thus, the general privacy of the area, the reluctance of residents to open up the shore and harbor facilities to outsiders by providing parking and marina facilities, and the plain lack of shorefront land strongly indicate that the same overall attitude and conditions prevail as in previous years.

CONCLUSIONS

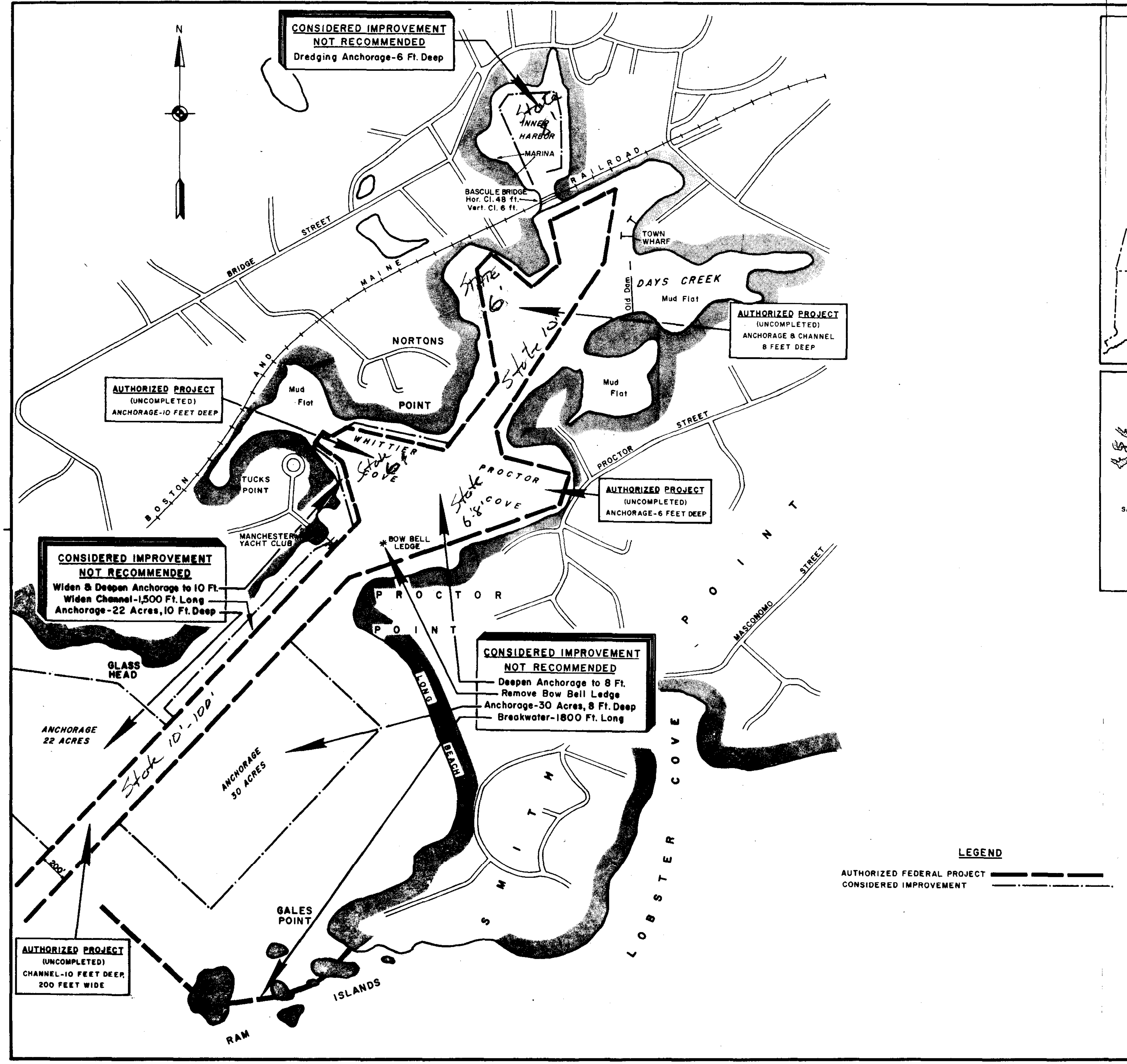
45. The Division Engineer finds that essentially all of the authorized Federal navigation project has been dredged by the Commonwealth of Massachusetts. He finds that these improvements are adequate for navigation, and that the existing 100-foot wide, 10-foot deep entrance channel is adequate for the number and type of craft using the harbor. He further finds that because of the limiting size and configuration of the harbor, there are no other areas susceptible to development of additional open anchorage space without costly ledge removal or breakwater and dredging work. He concludes that to provide for present and prospective navigation needs, the most practicable solution is the construction of suitable marina facilities by local interests.

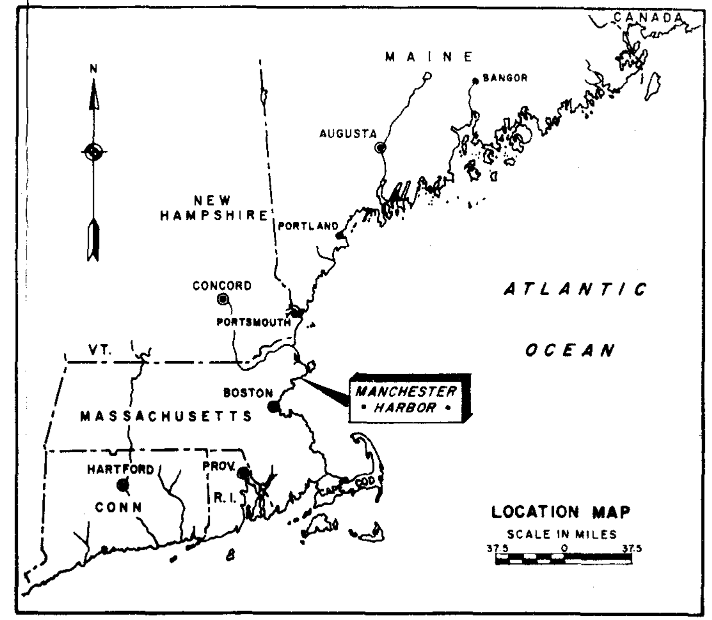
RECOMMENDATION

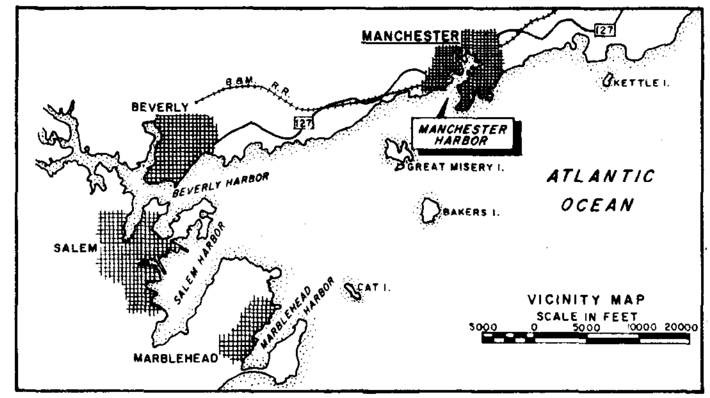
46. The Division Engineer recommends that no modification of the authorized Federal project at Manchester Harbor, Massachusetts be made at this time.

4 Incl
1. Maps - Plates Nos. 1 & 2
2. Appendix A - U. S. F. &W. Report
3. Appendix B - Comments of Local Interests
4. Info. - Sen. Res. 148

F. R. DAY
Colonel, Corps of Engineers
Acting Division Engineer







REVISION	DATE	DESCRIPTION	BY

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DR. BY A.D.C. | TR. BY A.D.C. | CK. BY H.H.G.

SUBMITTED: Herman H. Gyptill, PROJECT ENGINEER

Oscar E. Arpin, CHIEF, COASTAL DEVEL. SECT.

APPROVAL RECOMMENDED: CHIEF, PLANNING BRANCH

APPROVED: CHIEF, ENGINEERING DIVISION

MANCHESTER HARBOR, MASSACHUSETTS
GENERAL MAP

SCALE IN FEET
3000 0 3000 6000 9000

DATE MAY 1969

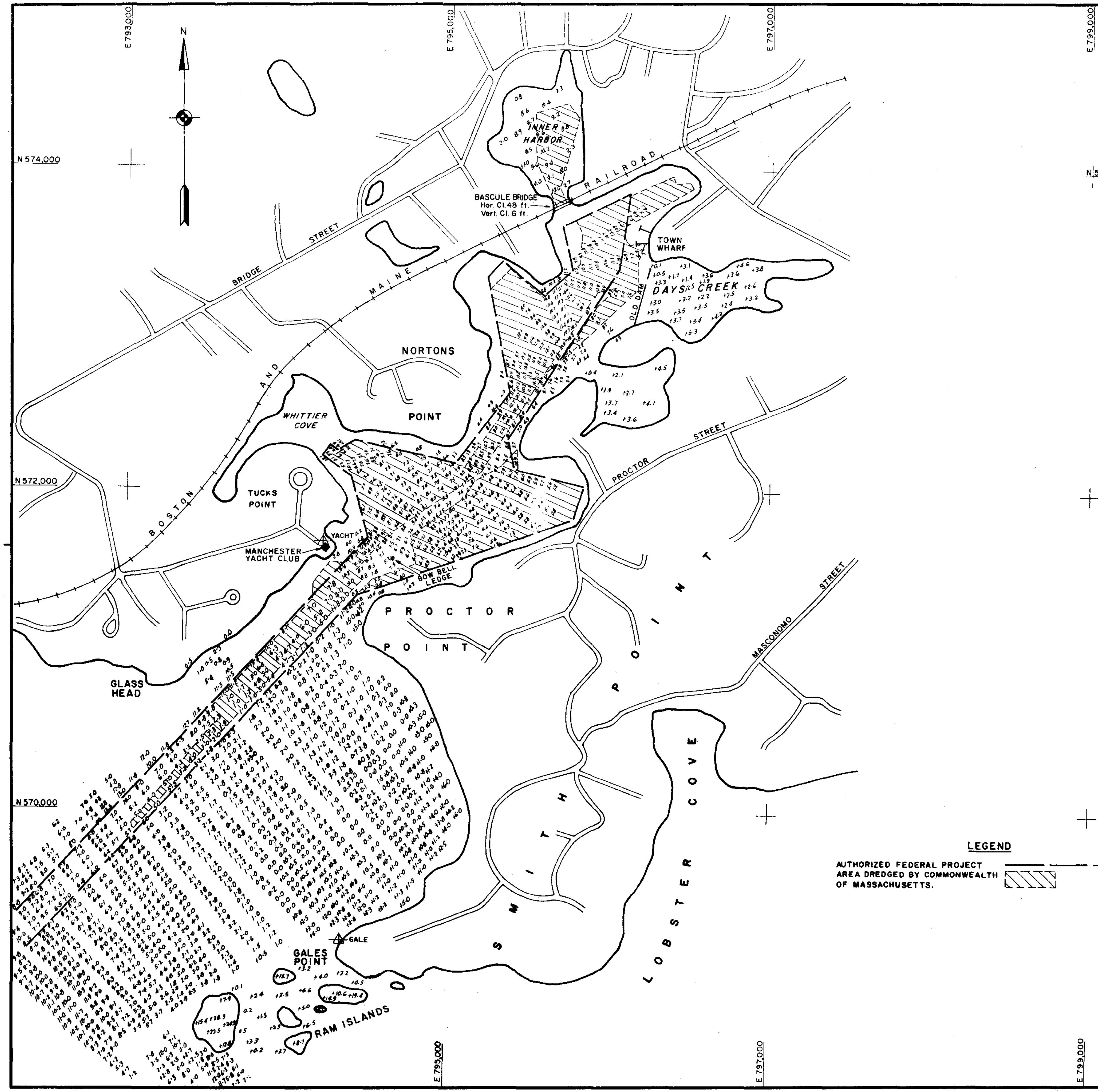
SCALE As shown

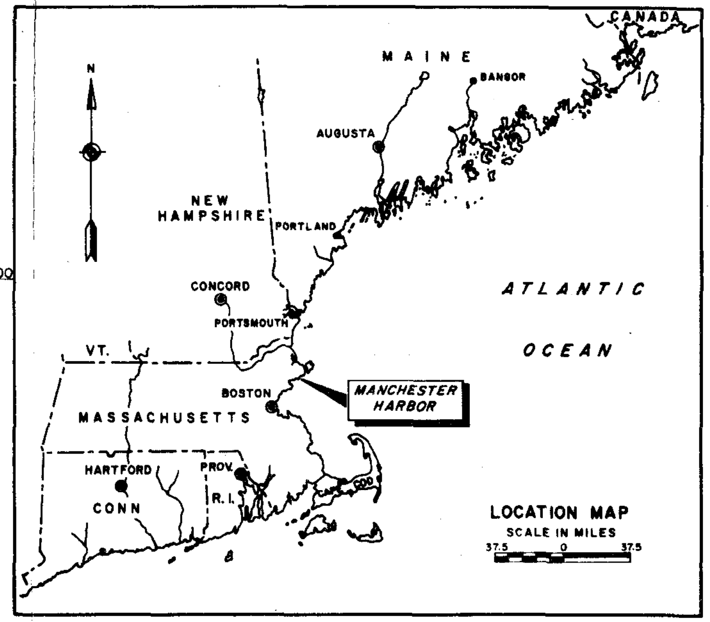
TO ACCOMPANY SURVEY REPORT DATED: 5 JUNE 1969

DRAWING NUMBER 48 F-3-3

SHEET 1 OF 2

PLATE NO. 1





NOTES:

Soundings are in feet and tenths and are referred to the plane of Mean Low Water.

Hydrography in vicinity of Gales Point from surveys by Corps of Engineers October 1968.

Hydrography and topography (entrance channel to inner harbor) from surveys by Commonwealth of Massachusetts in 1940, 1958 and 1967.

Coordinates are on the Lambert Grid System for Commonwealth of Massachusetts.

Field Books R.& H. 2659, 2660 and 2746.

LEGEND

AUTHORIZED FEDERAL PROJECT —— —— ——

AREA DREDGED BY COMMONWEALTH OF MASSACHUSETTS. (hatched)

REVISION	DATE	DESCRIPTION	BY

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DR. BY A.D.C. | TR. BY A.D.C. | CK. BY H.H.G.

SUBMITTED: Harmon H. Gryptill (signature) PROJECT ENGINEER

Oscar E. Ager (signature) CHIEF, COASTAL DEVEL. SECT.

APPROVAL RECOMMENDED: (signature) CHIEF, PLANNING BRANCH

APPROVED (signature) CHIEF, ENGINEERING DIVISION

MANCHESTER HARBOR, MASSACHUSETTS

SURVEY MAP

SCALE IN FEET
3000 0 3000 6000 9000

DATE MAY 1969

TO ACCOMPANY SURVEY REPORT DATED: 5 JUNE 1969

SCALE As shown

DRAWING NUMBER 48 F-3-3

SHEET 2 OF 2

PLATE NO. 2

APPENDIX A

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
U. S. POST OFFICE AND COURTHOUSE
BOSTON, MASSACHUSETTS 02109

January 10, 1969

Division Engineer
New England Division
U. S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Sir:

This is our conservation and development report on the navigational improvements for Manchester Harbor (Essex County), Massachusetts, which you are considering under authority of House Committee on Public Works Resolution adopted May 5, 1966. This report was prepared under authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-666 inc.), in cooperation with the Mass. Division of Marine Fisheries and the Mass. Division of Fisheries and Game and has their concurrence as indicated by letters dated January 6, 1969 and December 30, 1968, respectively. The report has also been coordinated with and represents the views of the Bureau of Commercial Fisheries.

Our August 3, 1967 preliminary report on this study stated that dredging of the anchorage areas is not expected to affect fish and wildlife habitat. We recommended that spoil be placed on an approved offshore area. This recommendation is still applicable.

We understand that your study has given consideration to enlarging the anchorage area in the inner harbor (upstream of the railroad bridge) and the anchorage area in the vicinity of Tucks Point. The dredging of an anchorage area of about 30 acres in the vicinity of Proctor Point was also considered. Your studies indicate, however, that there is not sufficient economic justification for the project at the present time. If improvements for Manchester Harbor are considered at some future date, we would appreciate being advised in sufficient time to determine whether conditions have changed to warrant a reappraisal of fish and wildlife resources as related to the proposed work.

We appreciate the opportunity to report on your planning.

Sincerely yours,

Richard E. Griffith

Regional Director

APPENDIX B

OFFICE OF THE
BOARD OF SELECTMEN
TOWN HALL, MANCHESTER, MASS. 01944

May 28, 1969

Colonel Frank T. Bane
Division Engineer
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Mass. 02154

Dear Colonel:

As a result of a request by the Board of Selectmen of the Town of Manchester, a resolution was adopted on 5 May 1966 by the U. S. House of Representatives, Committee on Public Works which authorized the Corps of Engineers to review the reports on the authorized Federal project in Manchester Harbor to determine the need and justification for modifying the project.

A meeting was held in Manchester on 16 May 1969 with an engineer from your office to review the results of the study. The study found that nearly all of the Federal project had been dredged by the Commonwealth of Massachusetts, and that there are no other areas susceptible to development of additional open area anchorage space which could be economically justified for improvement.

The Board of Selectmen and Harbor Committee accept the findings of the report, that no modification of the authorized project should be made at this time.

Very truly yours,

Benjamin F. Stasiak
Chairman--Board of Selectmen

Everett Morse
Chairman--Harbor Committee

MANCHESTER HARBOR, MANCHESTER, MASSACHUSETTS

Information called for by Senate Resolution 148, 85th Congress, Adopted 28 January 1958

1. Navigation Problem. Manchester Harbor is located on the north shore of Massachusetts Bay about 20 miles by water northeast of Boston Harbor, Massachusetts. There is an authorized Federal navigation project at Manchester Harbor, which provides for an entrance channel 200 feet wide and 10 feet deep extending from deep water in the bay to Proctor Point at the entrance to the inner harbor; and for three anchorage areas in the inner harbor between Proctor Point and the head of navigation just upstream of the Boston & Maine Railroad bridge, with depths ranging from 6 to 10 feet. However, the project was never constructed because local interests did not comply with the necessary items of local cooperation.

2. The principal navigation difficulty is one of insufficient mooring and berthing area for the existing and prospective recreational boating fleets.

3. Improvements Considered. Consideration was given to the requests of local interests for modification of the authorized project to provide for enlargement and deepening of the anchorages in the inner harbor and for additional anchorage in the outer harbor. The Commonwealth of Massachusetts has been performing dredging improvements within Manchester Harbor periodically since 1907, and as a result has accomplished most of the Federal project plus dredging in some other areas. Specifically, consideration was given to enlargement of the anchorage in the cove upstream of the railroad bridge, enlargement and deepening of the anchorages in Whittier Cove and Proctor Cove, provision of additional anchorage in unimproved coves within the inner harbor, provision of additional anchorage in the outer harbor protected by breakwaters, and widening the entrance channel.

4. Discussion. All possible open anchorage improvements as outlined above were studied and found to be not justified due to either insufficient benefits and excessive costs, privately developed shore-fronts precluding public access, or navigation features are already adequate such as the entrance channel. As a result, the Division

Engineer has concluded that the most practical solution is the construction of suitable marina facilities by local interests. Therefore, he has recommended that no modification of the authorized Federal project at Manchester Harbor be made at this time.